

I. In the claims:

Please add the following new claims 23-31:

1. (Original) A method for fault resolution in a computer system, comprising:
 - (a) configuring a cluster with a gateway for a network interface;
 - (b) issuing an operating system ICMP echo to peer nodes in said cluster and to said gateway through said network interface in response to a heartbeat loss detection; and
 - (c) analyzing a response from said echo to determine location of a fault in said cluster.
2. (Original) The method of claim 1, wherein the step of analyzing a response from said echo includes receiving said response and determining an intended recipient of said echo.
3. (Original) The method of claim 2, wherein receipt of a return of said echo from said peer nodes for said network interface within a predefined time interval is indicative of operation of said network interface.
4. (Original) The method of claim 2, wherein receipt of a return of said echo from said gateway for said network interface within a predefined time interval is indicative of operation of said network interface.
5. (Original) The method of claim 2, wherein absence of return of said echo from said peer nodes for said network interface within a predefined time interval is indicative of a fault selected from a group consisting of: a peer node fault, a network fault local to the peer node, and combinations thereof.
6. (Original) The method of claim 1, further comprising the step of issuing an application level ping to a peer node in response to both receipt of said echo response within a predefined time interval and said heartbeat loss detection.

7. (Original) The method of claim 1, further comprising comparing an echo response from a target node set for each network interface.
8. (Original) The method of claim 7, wherein the step of comparing an echo response from a target node set for each network interface includes criteria selected from the group consisting of: maximum availability of nodes in said network, availability of said gateway in said network, and combinations thereof.
9. (Original) A multiprocessor computer system, comprising:
 - a cluster with a gateway configured for a network interface;
 - an operating system ICMP echo adapted to be issued to peer nodes in a cluster and to said gateway through said network interface in response to a heartbeat loss detection; and
 - a response from said echo adapted to be analyzed for location of a fault in said cluster.
10. (Original) The system of claim 9, wherein analysis of said response from said echo includes determination of an intended recipient of said echo.
11. (Original) The system of claim 10, wherein receipt of a return of said echo from said peer nodes for said network interface within a predefined time interval is indicative of operation of said network interface.
12. (Original) The system of claim 10, wherein receipt of a return of said echo from said gateway for said network interface within a predefined time interval is indicative of operation of said network interface.
13. (Original) The system of claim 11, wherein absence of receipt of a return of said echo from peer nodes for said network interface within a predefined time interval is indicative of a fault selected from a group consisting of: a peer node fault, a network fault local to the peer node, and combinations thereof.

14. (Original) The system of claim 9, further comprising an application level ping adapted to be issued to a peer node in response to both receipt of said echo within a predefined time interval and a heartbeat beat loss detection.
15. (Original) The system of claim 9, further comprising a comparison tool adapted to compare an echo response from a target node for each network interface.
16. (Original) The system of claim 15, wherein said comparison tool determines a network interface path based upon criteria selected from the group consisting of: maximum availability of nodes in said network, availability of said gateway in said network, and combinations thereof.
17. (Original) An article comprising:
 - a computer-readable signal-bearing medium;
 - means in the medium for issuing an operating system ICMP echo to a peer node in a cluster and to a configured cluster gateway through said network interface in response to heartbeat loss detection;
 - means in the medium for analyzing a response message from said echo to determine location of a fault in said cluster.
18. (Original) The article of claim 17, wherein the medium is selected from a group consisting of: a recordable data storage medium, and a modulated carrier signal.
19. (Original) The article of claim 17, wherein said means for analyzing a response message from said echo includes receiving said response and determining an intended recipient of said echo.
20. (Original) The article of claim 17, further comprising means in the medium for issuing an application level ping to a peer node in response to both receipt of an echo response within a predetermined time interval and a heartbeat loss detection.

21. (Original) The article of claim 17, further comprising means in the medium for comparing an echo response from a target node set for each network interface.
22. (Original) The article of claim 21, wherein the step of comparing an echo response from a target node set for each network interfaces includes criteria selected from the group consisting of: maximum availability of nodes in said network, availability of said gateway in said network, and combinations thereof.
23. (New) A method for localizing a fault in a computer system, comprising:
 - sending periodic heartbeat messages to peer nodes in a network;
 - issuing an operating system ICMP echo to said peers nodes and a gateway through a network interface in response to a heartbeat loss; and
 - determining a location of a fault in said cluster through a response echo.
24. (New) The method of claim 23, wherein the step of issuing an operating system ICMP echo includes sending said echo on a first network interface and a second network interface for multi-homed nodes.
25. (New) The method of claim 23, wherein said loss is selected from a group consisting of: a node loss, and network path loss.
26. (New) The method of claim 23, further comprising comparing echo responses to determine a best path of connectivity.
27. (New) The method of claim 23, further comprising localizing a network connectivity problem in response to return of at least one echo.
28. (New) A method for resolving a fault in a computer system comprising:
 - determining a heartbeat loss in a cluster configured with a gateway for a network interface;

validating said heartbeat loss; and
localizing said loss.

29. (New) The method of claim 28, wherein the step of validating said heartbeat loss includes sending an ICMP echo to peer nodes and said gateway through a network interface.
30. (New) The method of claim 28, wherein the step of localizing said loss includes analyzing a response echo.
31. (New) The method of claim 28, further comprising determining a best path of connectivity through a comparison of echo responses.